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10/589,048	06/11/2007	Joachim Berthold	124-315USFR6162	5475

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EXAMINER	
SINGH, PREM C	

ART UNIT	PAPER NUMBER
1771	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/589,048	BERTHOLD ET AL.	
	Examiner	Art Unit	
	PREM C. SINGH	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 April 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11,13-21 and 23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11,13-21 and 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendment to claim 11 and cancellation of claims 12 and 22 is noted.

Claim Objections

2. Claim 11 is objected to because of the following informalities:

Claim 11 should have the status as "Currently Amended" and not as "previously presented".

Appropriate correction is required.

3. New ground of rejection necessitated by amendment to the claim follows.

4. A new reference, Liebermann et al (US Patent 5,177,153) has been included as evidence.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 11, 13-21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Promel et al (US Patent 6,225,421) ("Promel") in view of Job et al (US 2002/0128401) ("Job"), German, Jr. et al (US Patent 4,337,069) ("German") and Mehra et al (WO 96/27634) ("Mehra"), evidenced by Liebermann et al (US Patent 5,177,153) ("Liebermann").

7. With respect to claims 11, 13-17 and 23, Promel discloses a suspension process for preparing ethylene polymers (See column 1, lines 48-58; column 3, lines 5-10) having a bimodal mass distribution from a monomer and at a comonomer (See column 1, lines 5-9, 63-67; column 2, lines 1-4; column 6, lines 25-27) in at least two reactors which are connected in series (See column 1, lines 48-51) and comprise different reaction conditions within each of the reactors (See column 12, Table 5) wherein the process comprises subjecting the suspension to a reduction in pressure so as to remove the diluent, the ethylene, the hexane and optionally, the hydrogen from the composition (See column 5, lines 22-25). Promel further discloses using hydrogen, inert and the monomer in the first stage of the reactor (See column 3, lines 11-16, 26-36).

Promel also discloses a good yield with low content of oligomers generally comprising at least 99 wt% of the combination of homopolymer and copolymer (See column 5, lines 41-45; column 6, lines 10-15). Promel's silence on after-reactor clearly indicates that the invention avoids an after-reactor.

It is to be noted that Promel produces the polymer in a plant (See Examples 8, 9R, 10), which is expected to be a continuous process.

Promel does not appear to specifically disclose collecting off gases leaving all the reactors, cooling in a gas scrubber, and recycle of the liquid portion of cooled gases to the polymerization reactor.

Job discloses a process of olefin polymerization using a feed, catalyst and operating conditions (See paragraph 0032, 0073, 0075) similar to Promel. Job also

discloses that it is preferred to condense at least a portion of the recycle stream (See paragraph 0074). Job further discloses removal of hydrogen, inert and unreacted olefin from the reaction products and recycle to the reactor (See paragraph 0076, 000079). Job also discloses that a stream containing unreacted monomer is withdrawn from the reactor continuously, compressed, cooled, partly or fully condensed and recycled to the reactor (See paragraph 0076).

Job does not appear to specifically disclose cooling off gases in a gas scrubber.

German discloses an apparatus for gas phase olefin polymerization recycle gas scrubbing tower (See title; abstract). German also discloses, "Typically off-gases leaving the polymerization reactor, together with some entrained polymer fines, are fed to a recycle scrubber tower. Contact with circulating quench liquid, or liquid monomer, partially condense the reactor off-gas. After condensate is circulated and cooled, it can be returned to the upper portion of the scrubber or returned to the reactor as quench liquid. Overhead gas from the scrubber tower can be separated further and can be compressed for return to the reactors in a regulated stream" (Column 3, lines 52-61, emphasis added). German's disclosure indicates that the flow of recycle gases is regulated. German further discloses, "Such recycle scrubber typically is a high flow unit in which substantial quantities of off-gas and condensate are circulated" (Column 3, lines 61-63).

In view of Job disclosing compressing and cooling the off gases and German disclosing that recycle scrubber is a high flow unit in which substantial quantities of off-

gas and condensate are circulated, it would have been obvious to one with ordinary skill in the art at the time of invention to modify Promel process and use compressing and cooling off gases as disclosed by Job and German for recycle of gaseous and liquid components to the polymerization reactor for an economical process.

It is to be noted that German discloses use of a scrubber in a gas phase olefin polymerization process, however, it is expected that the scrubber could be used in a suspension polymerization process also. It is evidenced by Liebermann.

Liebermann discloses a suspension polymerization process for the preparation of polymeric material from gaseous and nongaseous monomers (See title; abstract). Liebermann also discloses, "Removal of the gaseous monomer from the vapor phase may be effected by any suitable technique. For example……recycling the reactor vapor space through an appropriate gaseous monomer scrubber, and the like" (Column 8, lines 3-9).

Promel/Job/German invention does not appear to specifically disclose the pressure and temperature of the compressed gases before and after cooling.

Mehra discloses an absorption process for rejection of reactor byproducts and recovery of monomers from waste gas streams in olefin polymerization process (See title and abstract). Mehra also discloses details of waste gas stream [10], compressed gas [14] cooled gas [18] (See figure 1; Example 1, page 25; Example 2, page 26; Example 3, page 27; Example 4, page 28). Mehra further discloses temperature and pressure of stream [10], [24] and [22]. This indicates that Mehra is expected to be

achieving temperature and pressure of compressed gases before and after cooling in a range as claimed.

In view of Mehra teaching the temperature and pressure of different streams, it would have been obvious to one with ordinary skill in the art at the time of invention to modify Promel/Job/German invention and specify the temperature and pressure of compressed gases before and after cooling for proper characterization of compressed gases for recovery of monomers and other constituents.

8. With respect to claim 18, Promel invention discloses use of hydrogen and transition metal catalysts, including Ti and Zr, in the suspension process (See column 3, lines 31-36; column 4, lines 16-25), however, the invention does not appear to specifically disclose use of Ziegler-Natta catalyst.

Job discloses use of Ziegler-Natta catalyst species which denotes any of the known metal species useful in polymerizing olefins that are present in Ziegler-Natta catalysts. For example, the species can include Ti, Hf, V, Cr, Zr and the like (See paragraph 0032). Obviously, combined Promel and Job's disclosure indicates that one with ordinary skill in the art would use any transition metal or Ziegler-Natta catalyst in the olefin polymerization because Ziegler-Natta catalyst comprises transition metals.

9. With respect to claim 19, Promel invention discloses a first reactor comprising hydrogen and at least one comonomer (1-hexene), the hydrogen being present in a concentration higher than the hydrogen concentration in the downstream reactor, and

the comonomer (1-hexene) concentration in the first reactor being lower than the comonomer concentration in the downstream reactor (See column 3, lines 31-36, 53-65 column 4, lines 1-15; Table 1).

10. With respect to claim 20, Promel discloses production of a polyolefin polymer comprising ethylene and a polyolefin polymer of an alpha-olefin comprising 6 carbon atoms (1-hexene) (See Table 1, 2).

11. With respect to claim 21, Promel discloses suspension medium comprising a saturated hydrocarbon comprising from 3 to 8 carbon atoms (See column 3, lines 5-17).

Response to Arguments

12. Applicant's arguments filed 04/29/2011 have been fully considered but they are not persuasive.

13. In the arguments on page 5, the Applicant argues that:

> The Examiner thus appears to apply Promel's "Option two," as allegedly teaching the separation of the gases. However, Promel's final reduction-in-pressure step is the second of two pressure reduction steps to remove light ends. The first pressure reduction step occurs after the production of homopolymer (A) in the first reactor. Gases are removed in both steps. In contrast, the current claims

recite collecting all off gases leaving the first reactor and the at least one downstream reactor. Therefore, Promel teaches away from the current claims.

In response, it is the examiner's position that according to Promel's option two, the gases exiting from the first reduction in pressure .....and from the final reduction in pressure are mixed, compressed and conveyed to a distillation column (See column 5, lines 26-32). Thus, Promel's option two is the same as claimed.

14. In the arguments on page 6, the Applicant argues that:

Job preferably relates to gas phase polymerization, (paragraph [0076]) not polymerization in suspension, as in the current claims. In relation to the cooling of unreacted monomer, Job refers to U.S. Patent No. 5,462,999 of Griffin et al. ("Griffin") as exemplifying the cooling of a stream containing unreacted monomer. However, Griffin refers to a conventional heat exchanger not the use of a water scrubber as in the present claims. Thus, Job also teaches the use of conventional heat exchangers, not a scrubber. With respect to German, it relates to gas phase olefin polymerization, not polymerization in a suspension process, as in the current claims. The Examiner cites Mehra as allegedly teaching the temperature and pressure of different streams, however, the treatment of gases in Mehra precedes an absorption process followed by distillation.

In response, it is the examiner's position that Job discloses, "The catalyst composition may be used for the polymerization of olefins by any suspension, solution, slurry, or gas phase processes, using known equipment and reaction conditions, and not limited to any specific type of reaction system" (Paragraph 0075).

Job does not explicitly disclose cooling of gases by a scrubber and German reference has been used to disclose that limitation (See Office action above).

German discloses using a scrubber in a gas phase olefin polymerization. It is expected however, that German process can be used in a suspension polymerization process also. It is evidenced by Liebermann (See Office action above).

Liebermann discloses a suspension polymerization process for the preparation of polymeric material from gaseous and nongaseous monomers (See title; abstract). Liebermann also discloses, "Removal of the gaseous monomer from the vapor phase may be effected by any suitable technique. For example.....recycling the reactor vapor space through an appropriate gaseous monomer scrubber, and the like" (Column 8, lines 3-9).

Mehra discloses the temperature and pressure of gaseous streams [10], [22] and [24]. It is to be noted that stream [10] is compressed in compressor [12], cooled in cooler [16] and separated in separator [20] similar to the claimed steps of treating off gases (See claims 13-17). Thus, Mehra's disclosure of temperature and pressure of streams [10], [22] and [24] (See Examples 1-3) indicates that the temperature and pressure of streams [14] and [18] is expected to be in a range as claimed.

15. In the arguments on page 7, the Applicant argues that:

> The Examiner has improperly used the invention as a blueprint for linking together pieces of prior art in order to find the invention obvious. Moreover, even if some of the claimed property limitations are disparately disclosed among the four references cited, the Examiner has not offered any reason why one skilled in the art would construct a suspension process for preparing polyolefin polymers simultaneously having all of the recited limitations in the manner claimed.

In response, it is the examiner's position that Promel discloses suspension polymerization, followed by separation of gases by any known means (See column 5, lines 16-22). Promel further discloses separation of gases by distillation and recycle to the polymerization reactor (See column 5, lines 26-40). Promel does not disclose cooling and using a scrubber.

Job discloses a process of olefin polymerization using a feed, catalyst and operating conditions (See paragraph 0032, 0073, 0075) similar to Promel. Job also discloses that a stream containing unreacted monomer is withdrawn from the reactor continuously, compressed, cooled, partly or fully condensed and recycled to the reactor (See paragraph 0076). Job does not disclose a scrubber.

German discloses an apparatus for gas phase olefin polymerization recycle gas scrubbing tower (See title; abstract). German also discloses, "Typically off-gases leaving the polymerization reactor, together with some entrained polymer fines, are fed to a recycle scrubber tower..... Overhead gas from the scrubber tower can be

separated further and can be compressed for return to the reactors in a regulated stream" (Column 3, lines 52-61). It is to be noted that German discloses use of a scrubber in a gas phase olefin polymerization process, however, it is expected that the scrubber could be used in a suspension polymerization process also. It is evidenced by Liebermann.

Liebermann discloses a suspension polymerization process for the preparation of polymeric material from gaseous and nongaseous monomers (See title; abstract). Liebermann also discloses, "Removal of the gaseous monomer from the vapor phase may be effected by any suitable technique. For example.....recycling the reactor vapor space through an appropriate gaseous monomer scrubber, and the like" (Column 8, lines 3-9).

Promel/Job/German invention does not appear to specifically disclose the pressure and temperature of the compressed gases before and after cooling.

Mehra discloses temperature and pressure of stream [10], [24] and [22] (See figure 1; Examples 1-3). Thus, Mehra is expected to be achieving temperature and pressure of compressed gases before and after cooling in a range as claimed.

16. In conclusion, the claimed invention is *prima facie* obvious over Promel in view of Job, German and Mehra, evidenced by Liebermann.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS 060211

/PREM C SINGH/
Primary Examiner, Art Unit 1771